

Remarks

Claims 1, 2, 4, 8-10, 13 and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,438,639 to Paulsen ("Paulsen"). Also, claims 1, 2, 4, 5, 8-12, 14, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,348,312 to Johnston ("Johnston"). In addition, claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnston, and claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnston in view of U.S. Patent No. 4,998,740 to Tellier ("Tellier") and over Paulsen in view of Tellier. Finally, claims 17-20 were deemed to be allowable if rewritten in independent form.

In this response, Applicants have amended claims 1, 2, and 17-19. Claims 1-20 continue to be pending. Reconsideration and withdrawal of the rejections is requested in view of the amendments and the following remarks.

A. Rejections under 35 U.S.C. § 102 (Paulsen):

Claims 1, 2, 4, 8-10, 13 and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Paulsen.

Paulsen describes a packing device for stopping a liquid from flowing between a shaft 1 and its casing 2. The packing device includes a resilient ring 3 connected to a substantially tubular resilient element 5 by a thin portion 6 acting as articulation. Tubular element 5 includes a lip 7 adapted to be applied on a surface portion 8 perpendicular to shaft 1 and a tubular element 9 extending in an axial direction. A circular spring, mounted in groove 11 of axially extending tubular element 9, acts in a radially inward direction so as to cause element 5 to pivot about thin portion 6 to apply lip 7 against surface portion 8 in an axial direction. See Paulsen column 1, line 66 to column 2, line 15, and Fig. 1.

Independent claim 1 recites an axial shaft seal disposed between a housing wall and a rotating shaft. The axial shaft seal includes the following elements:

an outer ring insertable into the housing wall in a stationary and sealing manner, the outer ring including a sleeve including a polymer material and having a curved bellows form providing a spring, the curved bellows form extending radially inward over its entire length and having a spring bellows form, a radially inward end portion of the sleeve having a first sealing surface; and

an inner ring connectable to the shaft in a non-twisting and sealing manner and including a ring flange extending radially outward so as to provide a second sealing surface for axially mating the first sealing face, wherein the spring urges the first sealing surface against the second sealing surface.

Applicants have amended claim 1, as shown by the underlining and strikeouts above, to clarify that the sleeve includes a curved bellows form providing a spring and extending radially inward over its entire length. Moreover, claim 1 was amended to recite that the spring urges the first sealing surface against the second sealing surface.

Applicants respectfully submit that Paulsen does not describe, for example, the features a curved bellows form providing a spring, and most certainly does not describe any curved bellows form providing a spring for urging “the first sealing surface against the second sealing surface.” Instead of a curved bellows form providing a spring, Paulsen relies on an additional exterior element -- namely, circular spring 10 mounted around the exterior of tubular element 9 -- to urge the sealing surfaces against one another. See Figs. 1-3 and column 2, lines 3-19. Moreover, the form of the Paulsen outer ring is specifically designed to give way, as opposed to providing a spring. Specifically, the Paulsen outer ring includes a “thin” portion 6 that connects outer portion of ring 3 to tubular element 5. The thin shape of portion 6 provides a pivot or “articulation” (col. 2, lines 2-3), so that under “the effect of concentric pressure of spring 10, element 5 pivots about thin portion 6 . . .” (col. 2, lines 11-14). Thus, instead of a curved bellows form for providing a spring as recited in claim 1, Paulsen’s outer ring has a form specifically designed *not* to spring, but instead to provide a low resistance pivot point, so that the form easily gives way to the action of the exterior circular spring 10.

Accordingly, withdrawal of the rejection to claims 1, 2, 4, 8-10, 13 and 15 under 35 U.S.C. §102(b) as anticipated by Paulsen is respectfully requested.

B. Rejections under 35 U.S.C. § 102 (Johnston):

Claims 1, 2, 4, 5, 8-12, 14, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Johnston.

Johnston describes a cassette seal for sealing off the gap between a bore hole and a shaft. The cassette seal includes an inner ring 3, secured to the shaft and forming a groove 4, an outer ring 5 secured in the bore hole and including an inward radial projection 5.1 that engages with a

groove of the inner ring. The radial projection includes a curved portion that bends back so as to extend radially outward and having a sealing lip 6.

As discussed in the preceding section, independent claim 1 has been amended to clarify that the outer ring includes a sleeve having “a curved bellows form providing a spring, the curved bellows form extending radially inward over its entire length.”

Applicants respectfully submit that Johnston does not describe at least this feature. Specifically, the only portion of the Johnston outer ring extension 5.1 that can arguably be deemed a “curved bellows form” is the curved portion leading to sealing surface 6. However, that curved portion of Johnston does not extend “radially inward over its entire length,” but rather is folded back upon itself so as to extend in a radially outward direction. See Johnston Figs. 1, 2, and 4. Indeed, the curved portion is purposefully designed to “widen in the radial direction to the outside.” Column 4, lines 54-63.

Accordingly, withdrawal of the rejections to claims 1, 2, 4, 5, 8-12, 14, and 16 under 35 U.S.C. § 102(b) as anticipated by Johnston is respectfully requested.

C. Rejections under 35 U.S.C. § 103:

Claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over Johnston, and claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Johnston in view of Tellier and over Paulsen in view of Tellier.

Claims 3, 6, and 7 depend from independent claim 1 and include all of its elements. As discussed above, neither Paulsen nor Johnston describe all of the features of claim 1. Applicants further submit that Paulsen cannot teach or suggest the feature of a bellows form providing a spring for urging the sealing surfaces against one another, and in fact teaches away from that feature by teaching a thin shaped portion that is easily bendable for articulating as a pivot. Furthermore, Applicants submit that Paulsen cannot teach or suggest a curved bellows form extending radially inward over its entire length, and in fact teaches away from that feature by teaching a curved portion that bends back around so as to be extending radially outward for at least part of its length. Moreover, Tellier, which describes a face seal assembly, also does not teach or suggest either of these features.

Accordingly, withdrawal of the rejections to claims 3, 6, and 7 under 35 U.S.C. § 103 is respectfully requested.

D. Allowable Subject Matter:


Claims 17-20 were deemed to be allowable if rewritten in independent form. Applicants have amended claims 17-19 to rewrite them in independent form and to include all of the elements of claim 1, from which they previously depended. Claim 20 depends from allowable claim 19. Claim 2 was amended to correct a typographical error.

CONCLUSION

For at least the reasons stated above, Applicant requests withdrawal of the rejections to claims 1-16 and allowance of allowed claims 17-20. It is respectfully submitted that the application is now in condition for allowance. Should the Examiner feel that an interview would advance prosecution of the present application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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